Chapter XIII
Higher Order Thinking in Online Courses

Kit Hang Leung
McGill University, Canada

ABSTRACT

This research studies higher order thinking (HOT) processes in asynchronous discussions situated in a campus-based course that involved 11 pairs of graduate students. In these discussions, students examined assessment strategies used for teaching purposes, jointly in one week. Taking a grounded theory approach, messages derived from discussions were analyzed with qualitative and quantitative analyses. The unit of analysis was concept. Thinking acts were categorized into communication sequences of initiation, response, and comment. These sequences were further categorized with a five-dimension taxonomy derived from the patterns of these acts observed. Statistical analysis was used to observe the frequency of these categories and to validate the categorization consistency among coders. The results strongly suggest that HOT emerges when existing ideas are expanded and changed, and when ideas are expanded, new concepts emerge as these ideas are pondered from a wider perspective. The implication is that online discussion is an effective learning activity when students participate.

INTRODUCTION

This chapter is about higher order thinking (HOT), that is, learning to think, which is considered to be an important outcome of collaborative problem solving (Brown, 1994; Greeno, 1998). In most psychological theories, for example, information processing, cognition is viewed as an individual person's mental operation rather than a social process. The study of HOT is not an exception. Flavell (1979) examines metacognition and cognitive monitoring as a cognitive development of individuals. Creativity is studied as processing and transforming information into new knowledge in an individual's mind (e.g., Guilford. 1975; Reitman, 1966). This implies that theories about HOT seldom interact with the social aspect of learning.

In contrast to the traditional theories of cognition, constructivists point out that thinking is a social process in which cognition is shared, distributed, and co-constructed by individuals in a group, and by a community as a holistic effort of these individuals (e.g., Lave, 1993, 1998; Rogoff, 1998; Scardamalia & Bereiter, 1999; Thomas, 2002; Wenger, 1998). HOT likely occurs as so-

cially shared cognition in a learning community (Brown, 1994; Greeno, 1998). This chapter aims to explore the relationship between HOT and social processes, specifically, learning to think in collaborative problem solving in online discussion. In doing so, it examines the relationship between the two from a constructivist perspective that is less focused on the individual, but is more focused on social interaction, particularly, on dialogic communication in asynchronous conferencing.

Dialogic Communication

In accordance to Vygotsky's (1997) dialogic communication, thinking is formulated in the processes of two interconnected communications. The first process is inner communication with oneself, for example, self-debate. When ideas involved in this internal communication are externalized, represented, and exchanged in a group of individuals, thinking about these ideas occurs in interpersonal communication, for example, public discussion. In this social interaction, meanings of such ideas are negotiated for an understanding. This kind of dialogic thinking is considered to be a learning conversation (Pask, 1976).

In Dewey's (1933) term, this can be considered to be reflective thought learned from the experience in joint actions. In congruence with Dewey, Resnick (1993) and Rogoff (1998) state that most knowledge derives from an interpretation of experience that is based on schemas, which is actively shaped; changed or transformed; and influenced by the learning conversations among members in a community. Thus, the notion of joint actions conceptualizes learning to think as a collaborative process and also pinpoints dialogic interaction as a contributing factor to HOT.

The assumption is that dialogic interaction is a medium that generates higher level cognitive processes. While decisions are made upon judgment, solutions are formulated based on meaning making via negotiation in a group (Bruffee, 1999; Resnick, 1993; Rogoff, 1998; Scardamalia & Bereiter, 1999). Thus, learning to think is situated in "actions of an inquiry," for example, clarifying a problem, explaining a solution, justifying a concept, as well as selecting and presenting evidence to support a perceived meaning. In the process of collaboration, HOT emerges as personal conceptions are reasoned internally in an individual's mind and are also pondered externally in social interaction with multiple perspectives. Thereby, HOT can be defined as a process of thinking about thinking that can be learned via conversation during collaborative inquiry.

CSCL and Online Discussion

Collaborative inquiry can be supported by computer technology, for example, computer-mediated communication (CMC) and is referred to as computer supported collaborative learning (CSCL). CSCL on the Internet usually takes a form of asynchronous discussion. Online discussion comprises textual communication in which discussants interact by exchanging electronic messages or e-mail. The processes of thinking about thinking are archived in such messages when the discussants conduct the actions of inquiry via writing. In the other words, CMC extends the use of the computer as a thinking tool (Papert, 1999) to connecting "both the physical and the social world" (Resnick, 1993, p. 3). The implication is that the relationship between HOT and CSCL is, theoretically, well established. Nevertheless, in practice, a body of literature indicates that limited research evidence can be identified to support such theory (Leung, 2005).

In regard to learning and interaction on the Internet, educational researchers seem to be in the midst of multiple efforts to examine the cognitive and interaction aspects of online discussion. As this occurs, I explore the emergence of

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/higher-order-thinking-online-courses/19744

Related Content

Investigation of Artificial Intelligence Models (AI) in Shariah Auditing of Islamic and Conventional Financing
Mohamed Sadok Gassouma (2025). *Implications of ICT for Islamic Finance and Economics (pp. 33-54).*
www.irma-international.org/chapter/investigation-of-artificial-intelligence-models-ai-in-shariah-auditing-of-islamic-and-conventional-financing/379848

Challenges in Online Collaboration: The Role of Shared Vision, Trust and Leadership Style
Kimiz Dalkir (2018). *Online Collaboration and Communication in Contemporary Organizations (pp. 118-138).*
www.irma-international.org/chapter/challenges-in-online-collaboration/202133

Institutional Memory and ICT: Ingredients for Direct Democracy and Global Solidarity
Lester Leavitt (2013). *International Journal of Information Communication Technologies and Human Development (pp. 41-63).*
www.irma-international.org/article/institutional-memory-and-ict/79260

Filtering Online Content in China
Jyh-An Lee (2012). *Computer-Mediated Communication across Cultures: International Interactions in Online Environments (pp. 66-76).*
www.irma-international.org/chapter/filtering-online-content-china/55561

P2P File Sharing: The Life and Death of Gnutella
Danny Hughesand James Walkerdine (2008). *Handbook of Research on Computer Mediated Communication (pp. 411-423).*
www.irma-international.org/chapter/p2p-file-sharing/19762